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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/764,583

01/27/2004

Kazuhiro Koto

2635-199

9133

23117

7590

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EXAMINER

DO, CHAT C

ART UNIT

PAPER NUMBER

2193

MAIL DATE

DELIVERY MODE

06/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/764,583

Applicant(s)

KOTO ET AL.

Examiner

Chat C. Do

Art Unit

2193

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/30/06; 07/06/04; 01/27/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>01/27/04 and 10/30/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figure 8 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 5, 8, and 13 are objected to because of the following informalities:

Re claim 5, the applicant is advised to write the acronym "LSB" as "least significant bit" for clarification.

Similar objection is made for claims 8 and 13.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Art Unit: 2193

4. Claims 1-16 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-16 cite an apparatus for converting data in accordance with a mathematical algorithm. In order for claims to be statutory, claims must either include a practical/physical application or a concrete, useful, and tangible result. However, claims 1-16 merely disclose steps/components for converting data from one format to another format without further disclosing a practical/physical application or a useful and tangible result since the claims appear to preempt every substantial practical application of the idea embodied by the claim and no limitations in the claims that breathes sufficient life and meaning into the preamble so as to limit it to a particular practical application rather than being so broad and sweeping as to cover every substantial practical application of the idea embodied therein. In addition, the components in the claims are software module to execute for performing method. Therefore, claims 1-16 are directed to non-statutory subject matter.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2193

5. Claims 1-5, 8, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Hinds et al. (U.S. Patent Publication Application No. 2004/0128331).

Re claim 1, the admitted prior art discloses in the background of invention pages 1-3 an electronic control apparatus which incorporates a floating-point arithmetic function and performs various types of calculation and control operations in accordance with a predetermined computer program (e.g. lines 13-22 in page 1 and lines 8-20 in page 2), comprising map data that comprise a set of map points and a set of map values respectively corresponding to map points (e.g. lines 11-15 in page 2). The admitted prior art fails to disclose a conversion means for operating on to convert at least one of set of map points and set of map values from fixed-point representation to floating-point representation. However, Hinds et al. disclose in Figures 5 and 8 a conversion means for operating on to convert at least one of set of data from fixed-point representation to floating-point representation (e.g. fixed-point to floating-point conversion flow in Figures 5 and 8). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a conversion means for operating on to convert at least one of set of data from fixed-point representation to floating-point representation as seen in Hinds et al.'s invention into the admitted prior art's invention because it would enable to efficiently to convert for reducing in storage (e.g. paragraphs [0016-0017]).

Re claim 2, the admitted prior art further discloses in the background of invention pages 1-3 map points are expressed in floating-point representation in map data and map

values are expressed in fixed-point representation in map data (e.g. in lines 8-20 in page 2 wherein the data must be in either format), and wherein data expressing set of map values are of smaller amount than data which express set of map points (e.g. inherently since the bits representing data in the fixed-point data is less than the bits representing the data in floating point). The admitted prior art fails to disclose the other data is in other format. However, Hinds et al. disclose in Figures 8-9 the other data is in other format (e.g. in Figures 8-9 discloses a conversion means for converting from fixed-point to floating point or vice versa, thus the data can be in either format initially). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the other data is in other format as seen in Hinds et al.'s invention into the admitted prior art's invention because it would enable to efficiently to convert for reducing in storage (e.g. as of fixed-point in paragraphs [0016-0017]) or enable to quicker to performed operation (e.g. as of floating-point in paragraph [0016]).

Re claim 3, the admitted prior art further discloses in the background of invention pages 1-3 map points are expressed in fixed-point representation in map data and map values are expressed in floating-point representation in map data (e.g. in lines 8-20 in page 2 wherein the data must be in either format), and wherein data expressing set of map values are of greater amount than data which express set of map points (e.g. inherently since the bits representing data in the fixed-point data is less than the bits representing the data in floating point). The admitted prior art fails to disclose the other data is in other format. However, Hinds et al. disclose in Figures 8-9 the other data is in other format (e.g. in Figures 8-9 discloses a conversion means for converting from fixed-point to

floating point or vice versa, thus the data can be in either format initially). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the other data is in other format as seen in Hinds et al.'s invention into the admitted prior art's invention because it would enable to efficiently to convert for reducing in storage (e.g. as of fixed-point in paragraphs [0016-0017]) or enable to quicker to performed operation (e.g. as of floating-point in paragraph [0016]).

Re claim 4, the admitted prior art fails to disclose in the background of invention pages 1-3 map data and map values are both expressed in fixed-point representation in map data, and wherein conversion means performs conversion of both map points and map values from fixed-point representation to floating-point representation. However, Hinds et al. disclose in Figures 8-9 map data and map values are both expressed in fixed-point representation in map data, and wherein conversion means performs conversion of both map points and map values from fixed-point representation to floating-point representation (e.g. Figures 5 and 8 discloses a means for converting any fixed-points to floating-points). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the means of map data and map values are both expressed in fixed-point representation in map data, and wherein conversion means performs conversion of both map points and map values from fixed-point representation to floating-point representation as seen in Hinds et al.'s invention into the admitted prior art's invention because it would enable to efficiently to convert for reducing in storage (e.g. paragraphs [0016-0017]).

Re claim 5, the admitted prior art fails to disclose in the background of invention pages 1-3 map values indirectly express respective physical quantity values, and comprising means for providing a LSB conversion value that is expressed in floating-point representation and represents a physical quantity value that has been predetermined as corresponding to a least significant bit of fixed-point representation data, wherein map conversion means generates floating-point data expressing a value of a physical quantity corresponding to an interpolated value of map values by using data converted to floating-point representation in conjunction with LSB conversion value. However, Hinds et al. disclose in Figures 5 and 8 the steps of converting from fixed-point to floating point including map values indirectly express respective physical quantity values, and comprising means for providing a LSB conversion value that is expressed in floating-point representation and represents a physical quantity value that has been predetermined as corresponding to a least significant bit of fixed-point representation data (e.g. paragraphs [0025, 0042, and 0101-0102] wherein the LSB conversion value is a decimal point location within the fixed-point representation), wherein map conversion means generates floating-point data expressing a value of a physical quantity corresponding to an interpolated value of map values by using data converted to floating-point representation in conjunction with LSB conversion value (e.g. Figures 5 and 8 and table 3). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the map values indirectly express respective physical quantity values, and comprising means for providing a LSB conversion value that is expressed in floating-point representation and represents a physical quantity value

that has been predetermined as corresponding to a least significant bit of fixed-point representation data, wherein map conversion means generates floating-point data expressing a value of a physical quantity corresponding to an interpolated value of map values by using data converted to floating-point representation in conjunction with LSB conversion value as seen in Hinds et al.'s invention into the admitted prior art's invention because it would enable to provide correct floating-point conversion (e.g. paragraphs [0063 and 0065]).

Re claim 8, the admitted prior art fails to disclose in the background of invention pages 1-3 a means for providing a LSB conversion value that is expressed in floating-point representation and represents a physical quantity value that has been predetermined as corresponding to a least significant bit of fixed-point representation data, wherein conversion means utilizes LSB conversion value and map value data converted to floating-point representation to obtain a physical quantity value corresponding to map point data and expressed in floating-point representation. However, Hinds et al. disclose in Figures 5 and 8 a means for providing a LSB conversion value that is expressed in floating-point representation and represents a physical quantity value that has been predetermined as corresponding to a least significant bit of fixed-point representation data (e.g. paragraphs [0025, 0042, and 0101-0102] wherein the LSB conversion value is a decimal point location within the fixed-point representation), wherein conversion means utilizes LSB conversion value and map value data converted to floating-point representation to obtain a physical quantity value corresponding to map point data and expressed in floating-point representation (e.g. Figures 5 and 8 and table 3). Therefore, it

would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a means for providing a LSB conversion value that is expressed in floating-point representation and represents a physical quantity value that has been predetermined as corresponding to a least significant bit of fixed-point representation data, wherein conversion means utilizes LSB conversion value and map value data converted to floating-point representation to obtain a physical quantity value corresponding to map point data and expressed in floating-point representation as seen in Hinds et al.'s invention into the admitted prior art's invention because it would enable to provide correct floating-point conversion (e.g. paragraphs [0063 and 0065]).

Re claim 11, the admitted prior art in view of Hinds et al. fail to disclose the conversion means executes conversion by using a program that is written in assembler language. However, the examiner takes an Office notice that a program is written in assembler language is well known in the art of technology and widely used in circuit. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add the conversion means executes conversion by using a program that is written in assembler language into the admitted prior art in view of Hinds et al.'s invention because it would enable to reduce the complexity and increase performance of instruction.

Re claim 13, it has similar limitations cited in claim 5. Thus, claim 13 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

6. Claims 10, 12, and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Hinds et al. (U.S. Patent Publication Application No. 2004/0128331), as applied to claim 1 above, and further in view of Ford (U.S. Patent Publication Application No. 2003/0065698).

Re claim 10, the admitted prior art in view of Hinds et al. fail to disclose a means for providing ID data which express a type of fixed-point representation data, wherein conversion means performs conversion of floating-point representation data to fixed-point representation data based on ID data. However, Ford discloses in Figure 5 a means for providing ID data which express a type of fixed-point representation data, wherein conversion means performs conversion of floating-point representation data to fixed-point representation data based on ID data (e.g. paragraph [0044] and component 515 in Figure 5). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a means for providing ID data which express a type of fixed-point representation data, wherein conversion means performs conversion of floating-point representation data to fixed-point representation data based on ID data as seen in Ford's invention into the admitted prior art in view of Hinds et al.'s invention because it would enable to identify the type of operand (e.g. paragraph [0044]).

Re claim 12, the admitted prior art in view of Hinds et al. fail to disclose a means for providing ID (identifier) data which have been predetermined as corresponding to map data and which indicate whether or not both map points and map values of map data are expressed in floating-point representation, and means for inhibiting conversion operation of conversion means when ID data indicate that both map points and map

values are expressed in floating-point representation. However, Ford discloses in Figure 5 a means for providing ID (identifier) data which have been predetermined as corresponding to map data and which indicate whether or not both map points and map values of map data are expressed in floating-point representation (e.g. components 515 and 520 in Figure 5 and paragraph [0044]), and means for inhibiting conversion operation of conversion means when ID data indicate that both map points and map values are expressed in floating-point representation (e.g. component 525 in Figure 5). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a means for providing ID (identifier) data which have been predetermined as corresponding to map data and which indicate whether or not both map points and map values of map data are expressed in floating-point representation, and means for inhibiting conversion operation of conversion means when ID data indicate that both map points and map values are expressed in floating-point representation as seen in Ford's invention into the admitted prior art in view of Hinds et al.'s invention because it would enable to optimize the operation/performance by eliminating unnecessary operation (e.g. paragraph [0044]).

Re claim 15, it has similar limitations cited in claim 10. Thus, claim 15 is also rejected under the same rationale as cited in the rejection of rejected claim 10.

Re claim 16, it has similar limitations cited in claim 12. Thus, claim 16 is also rejected under the same rationale as cited in the rejection of rejected claim 12.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
- a. U.S. Patent No. 6,144,977 to Giangarra et al. disclose a circuit and method of converting a floating point number to a programmable fixed point number.
 - b. U.S. Patent No. 6,049,343 to Abe et al. disclose graphics processing unit and graphics processing system.
 - c. U.S. Patent No. 7,216,138 to Abdallah et al. disclose a method and apparatus for floating point operations and format conversion operations.
 - d. U.S. Patent No. 6,757,700 to Druck discloses a self-stabilizing, portable and efficient computer arithmetic using mappings of D scale points.
 - e. U.S. Patent No. 6,671,796 to Sudharsanan et al. disclose a converting an arbitrary fixed point value to a floating point value.
 - f. U.S. Patent No. 5,638,312 to Simone discloses a method and apparatus for generating a zero bit status flag in a microprocessor.
 - g. U.S. Patent No. 6,873,324 to Saito et al. disclose a data processing method, recording medium and data processing apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The examiner can normally be reached on M => F from 7:00 AM to 5:30 PM.


Art Unit: 2193

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2193

June 25, 2007

A handwritten signature in black ink, appearing to be 'Chat C. Do', written in a cursive style.